

INSTRUCTIONS: Change values in red to your input data. Values in blue are calculated.

2. INTERNAL ENERGY HEAT GAINS, BTUH

	AREA	DENSITY	HEAT	HEAT
	SQ FT	W/SQ FT	KW	BTUH
LIGHTS	18,650	0.50	9.33	31,826
EQUIP	6,625	0.50	3.31	11,306
MISC	1,000	0.00	0.00	0
SUM				43,132

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3. OCCUPANT INTERNAL HEAT GAIN, BTUH

AREA	OCC PER	TOTAL	SENSIBLE	HEAT
SQ FT	1000 SQ FT	# OF OCC.	BTUH/OCC	BTUH
18650	10	187	314	58,561

4. SOLAR GAIN

AREA	SHADE %	SOLAR	HEAT
SQ FT	SC	BTUH/SF	BTUH
NORTH	7,500	65%	0
EAST	1,250	65%	0
SOUTH	0	65%	0
WEST	1,250	65%	0
SUM	10,000		0

7. BALANCE POINT TEMPERATURE CALCULATION

$BPT F = T1 - GAINS / (RATE OF LOSS) = F - BTUH / (BTUH / F)$

$BPT F = T1 - (INTERNAL + PEOPLE + SOLAR) / (UA + QI)$

BPT F = 51.24 degrees F Outside temperature

	AREA	R-VALUE	UA
	SQ FT	INSUL.	BTUH/F
WALLS	9500.00	9.00	1055.56
GLASS	500.00	3.00	166.67
ROOF	10000.00	18.00	555.56
DOORS	200.00	2.00	100.00
SUM	20200.00		1877.78
AVERAGE		10.76	

6. RATE OF O/A LOSSES, BTUH/F

# OF	VENT	ACH	Qv
OCC.	CFM/OCC	CU FT/HR	BTUH/F
187	15	167850	3021

8. HEAT BALANCE

	BTUH	TOTAL
GAINS		101693
31% LIGHTS	31826	
11% EQUIP	11306	
0% MISC	0	
0% SOLAR	0	
58% PEOPLE	58561	
LOSSES		101693
22% WALLS	21911	
3% GLASS	3460	
11% ROOF	11532	
2% DOORS	2076	
62% O/A	62715	

9. SUMMARY OF FLOW AT BALANCE POINT CONDITION

Net glass Btuh = solar gain - heat loss	-3460
Net people Btuh = metabolic gain - O/A loss	-4154

See bin data for relationship of balance point temperature to climate. The building will be in the heating mode for all hours the outdoor drybulb is below the BPT. Above the balance point the building is in the cooling mode. If the balance point is below 55 F, free ventilation cooling with 100% O/A may be feasible for dry bulb temperatures between 55 and BPT.

Heat Gain



Heat Loss

